

What Is Claimed Is:

1. A flow-through pressure regulator, comprising:
 - a housing having an inlet and an outlet disposed along a longitudinal axis;
 - a divider separating the housing into a first chamber and a second chamber, the divider including:
 - a seat having a sealing surface in the first chamber and a second surface in the second chamber, the seat defining a first flow path from the sealing surface to the second surface, the first flow path having a first flow axis along the longitudinal axis;
 - a diaphragm extending between the housing and the seat;
 - a retainer securing the diaphragm to the seat, the retainer including:
 - a base portion proximate the seat;
 - an intermediate portion extending along the longitudinal axis from the base portion toward the outlet;
 - an end portion extending from the intermediate portion, the end portion including at least one aperture, the at least one aperture permitting fluid communication between the first flow path and the second chamber; and
 - a surface disposed between the first flow path and the end portion, the surface defining a second flow path with the second seat surface, the second flow path having a second flow axis disposed radially outward from the longitudinal axis; and
 - a closure member being arranged between first and second configurations relative to the sealing surface, the first configuration substantially preventing fluid communication through the first flow path, and the second configuration permitting fluid communication through the first flow path.

2. The flow-through pressure regulator of claim 1, further comprising a flow distributor member having a lower surface that provides the surface, an upper surface, and a side surface between the lower surface and the upper surface, the lower surface defining the second flow path with the second seat surface.
3. The flow-through pressure regulator of claim 2, wherein the flow distributor member side surface and the retainer intermediate portion define a third flow path, the third flow path having a third flow axis along the longitudinal axis.
4. The flow-through pressure regulator of claim 3, wherein the flow distributor member side surface includes a stepped portion proximate the flow distributor member upper surface, the stepped portion and retainer end portion defining a fourth flow path, the fourth flow path having a fourth flow axis disposed radially inward toward the longitudinal axis.
5. The flow-through pressure regulator of claim 4, wherein the flow distributor member comprises plastic.
6. The flow-through pressure regulator of claim 4, wherein the flow distributor member comprises metal.
7. The flow-through pressure regulator of claim 1, wherein the second seat surface, the retainer intermediate portion, and the retainer end portion define a collection chamber, the collection chamber being in fluid communication with the first flow path and the at least one aperture.
8. The flow-through pressure regulator of claim 1, comprising:
a resilient element extending along the longitudinal axis and biasing the divider toward the closure member,

wherein the housing includes first and second housing parts, the first housing part including the inlet and defining the first chamber, and the second housing part including the outlet and defining the second chamber,

wherein the diaphragm includes a first perimeter sandwiched between the first and second housing parts,

wherein the base portion includes an annular portion extending outwardly from the intermediate portion relative to the longitudinal axis,

wherein the diaphragm includes a second perimeter being sandwiched between the seat and the annular portion, and

wherein the resilient element includes a first end engaging the second housing part and a second end engaging the annular portion.

9. The flow-through pressure regulator of claim 4, comprising:

a plurality of projections, each of the projections having a proximate end and a distal end, the proximate end engaging the flow distributor member side surface, the distal end engaging the intermediate portion of the retainer.

10. The flow-through pressure regulator of claim 9, wherein the proximate end extends between the flow distributor member lower surface and the flow distributor member upper surface, and is integrally formed with the flow distributor member side surface.

11. The flow-through pressure regulator of claim 10, wherein an upper portion of the proximate end includes a surface that forms a continuous curve with the stepped portion.

12. A method of flowing fluid through a pressure regulator, the pressure regulator including a divider separating a housing into a first chamber and a second chamber, the housing having an inlet and an outlet disposed along a longitudinal axis, the divider including a seat, a diaphragm, a retainer and a flow distributor member, the seat defining a first flow path having a first flow axis along the longitudinal axis, the flow distributor member defining a second flow path with the seat, the second flow path having a second flow axis disposed radially outward from the longitudinal axis, the retainer having at least one aperture, and the diaphragm extending between the housing and the seat, the method comprising:

flowing the fluid through the first flow path;
flowing the fluid through the second flow path; and
flowing the fluid through the at least one aperture.

13. A method of flowing fluid through a pressure regulator, the pressure regulator including a divider separating a housing into a first chamber and a second chamber, the housing having an inlet and an outlet disposed along a longitudinal axis, the divider including a seat, a diaphragm and a retainer, the retainer having at least one aperture, and the diaphragm extending between the housing and the seat, the method comprising:

flowing the fluid through a flow path formed in the seat;
redirecting the fluid radially outward from the longitudinal axis;
redirecting the fluid in the direction of the longitudinal axis; and
flowing the fluid through the at least one aperture.

14. The method of claim 13, wherein the redirecting the fluid radially outward from the longitudinal axis includes disposing a flow distributor member between the seat and the at least one aperture.

15. The method of claim 14, wherein the disposing the flow distributor member between the seat and the at least one aperture includes engaging an intermediate portion of the retainer with protrusions that extend radially outward from the flow distributor member.
16. The method of claim 14, wherein the redirecting the fluid in the direction of the longitudinal axis includes forming another flow path with a side surface of the flow distributor member and an intermediate portion of the retainer.